The Soybean Digest

Official Publication

OF

THE AMERICAN SOYBEAN ASSOCIATION

VOLUME 1 · NUMBER 12 OCTOBER · 1941

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THE *Soybean Digest*

VOL. I — OCTOBER · 1941 — No. 12

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PRICE IS KING TO OIL BUYERS

WE still maintain that usage of essential fats and oils is determined by cold business figures and not sentimentality. The different factors within the edible fats and oils field must maintain a balance. Prices will see that they do so.

In August of 1940 soybean oil was cheap, relatively. The margarine manufacturers used 5,496,955 pounds of it, compared to 8,275,278 pounds of cottonseed oil. In August of 1941 soybean oil was relatively higher priced, even though supplies were greater. Usage of soybean oil in margarine shrank to 4,001,875 pounds — a decrease of 1,495,080 pounds. At the same time the usage of cottonseed oil in the same product increased to 10,130,879 pounds — an increase of 1,855,601 pounds. Total production of margarine increased approximately 15 per cent, while soybean oil usage was shrinking over 26 per cent. Do not let anyone tell you the relative prices do not determine usage. Or that soybean oil is being used in industry because it is a domestic fat. Usage of coconut oil in margarine was more than twice as great in August of 1941 as in August 1940. Over 2,421,307 pounds of it were imported and used in August of 1941 in this one industry. Did you say we would not need an import duty on fats and oils when ocean-going bottoms become more available for transporting foreign oils and oil-bearing materials?

With copra being piled up on the docks of producing countries, ready for shipment the first time an empty hold presents itself? With enough of it there now to supply this nation for a couple years? And with stocks being constantly added? Where will the soybean oil market go when those stocks start moving? Will users continue with it because it is a domestic oil? Not if they are the kind of business men we think they are. Business methods will dictate use of the cheapest source of materials. Domestically produced materials at present-day price levels will be out of the picture.

Either we must prepare *now* for that time — or we must make up our minds to again let the tropical sections of the world supply our fats and oils. It is our choice to make — and it is our turn to act. What will we do about it?

THIS month our pages are again largely filled with the presentations which were made at the 21st annual convention of the American Soybean Association. They serve as a review of progress for the past year of growth in the industry, and they bring together facts, figures and ideas from throughout the various phases of the industry. The proceedings which had been issued in years previous served as a "yearbook" of the "miracle crop" of American agriculture. The September and October issues of *The Soybean Digest* are designed to do that same job, giving our readers an insight into the happenings at the convention and in the industry. The advertisers who have thought our publication to be of value to them have made it possible for us to put out the large September issue, and to finish up the convention in this issue. They deserve your patronage. Without them *The Soybean Digest* could not reach you each month.

THIS issue writes "30" to Volume I of *The Soybean Digest*. It has been a year of progress, we feel, and at the same time it has opened our eyes to the real possibilities of our publication. Naturally we feel that the next year will show even more progress, for it is destined to be a year of great progress in the soybean industry. With 1942 soybean acreage already set as high as 7 million acres, and with possibilities of an increase above that figure, we have on our hands a major crop. The problems connected with rapid growth must be ironed out; we must fortify and brace ourselves for the downward swing which is sure to come after the war is over — we must prepare during the coming year not only for present growth but for future problems. There will be many. We feel we may play an important part in solving those problems through the dissemination of accurate information to the members of the industry. Just as fast as we can get accurate figures and facts they will be published. The soybean industry is yours — *The Soybean Digest* is yours — and we welcome your suggestions and comments on stories and editorial policy.

MANY of you have inquired concerning a binder in which to preserve your first volume of *The Soybean Digest*. We had expected to have an inexpensive and clever one to announce to you in this issue. Uncle Sam needs the paperboard worse than we do, hence he exercised his priorities on it. We will have a definite announcement for you next time. Naturally we are pleased that so many of you are interested in keeping each copy of our publication for reference use, and we want to do everything possible to make it convenient for you to do so. Watch for an announcement.

LAST Spring we commented editorially on efforts which were being made to market seed of a supposedly new variety of soybeans known as McClave. Various other names have been applied to it since that time. Its chief characteristic was a high selling price — in the neighborhood of $25 per bushel.

Again this year the McClave, under that and various other names, is being thrust upon the unsuspecting and unwary farmers of the Midwest at fancy prices. Where the McClave name is not welcome the promotors have used other nomenclature. But the bean seems to remain the same.

To all appearances the McClave seems to be a variety which was discarded in most of the cornbelt sections a number of years ago. When planted beside the old Midwest there just seem to be no characteristics to distinguish the two varieties. It is too late for most of the cornbelt, will not yield as much as our common varieties, shatters badly where it does mature, and carries an oil content varying from three to five percent less than other varieties grown under the same soil and weather conditions. Because of the latter fact the processors of beans have already taken steps to discount any of the beans showing up at their plants. Current discounts seem to run from 29 to 40 cents per bushel

(*Continued on page 7*)

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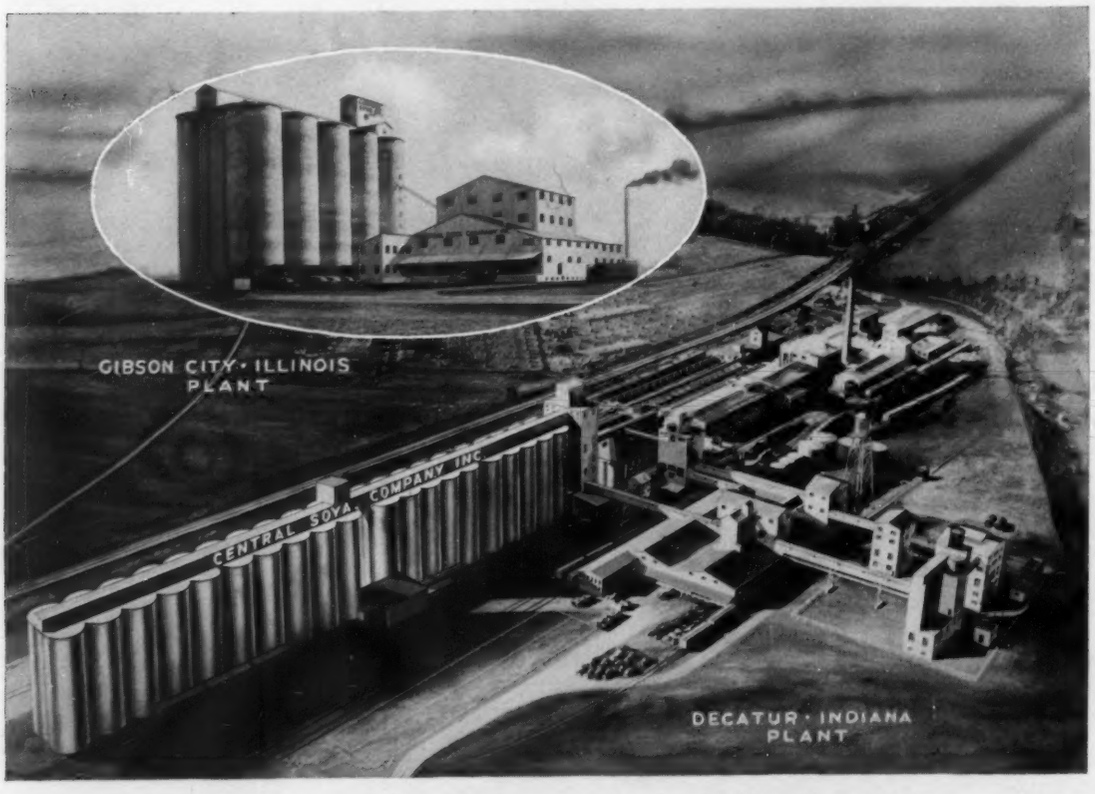

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GEO. M. STRAYER, Editor ROBERT BLISS, Managing Editor

VOL. I · NO. 12

MILLION MORE ACRES, SAYS A. A. A.

A million more acres of soybeans for beans is the American soybean farmers' goal in the "Food for Freedom" campaign. Under the 1942 Agricultural Adjustment Administration, 7,000,000 acres of soybeans are planned. The 1941 acreage is listed by the U. S. D. A. as 5,918,000 acres.

All state and county AAA committees have been supplied with their state and county goals, and the township committees will be utilized to line up individual farmers for attainment of the goals.

Illinois, the leading soybean state, has been asked to supply 281,000 acres of the increase, for a total of 2,686,000 acres in 1942. The Indiana goal has been set at 1,090,000 acres, while the farmers of Iowa have been asked to plant 1,018,000 acres.

Up 640,000 Acres

The other three states usually designated as commercial soybean producing — Ohio, Missouri and North Carolina — have been asked to grow 680,000, 222,000, and 225,000 acres, respectively; bringing the total for the commercial area to 5,921,000 acres, an increase of 640,000 acres over the 1941 total of 5,281,000 for the six states.

The net asked increase in the acreage for the states which have been considered non-commercial in their soybean production is 442,000 acres — from 637,000 acres in 1941 to a 1942 goal of 1,079,000 acres.

If the goals are carried out — and this appears almost certain — the soybean belt will be shifted slightly southward. The 12 southern states of Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia have been asked to produce 1,020,000 acres of beans, which, though only 2,000 acres more than has been assigned to Iowa, is more than double the 1940 total soybean acreage of 475,000 acres for the southern states.

The most radical upward shifts in soybean acreage are asked in the lower Mississippi valley. In Mississippi, the 1942 goal is 250,000 acres, against 85,000 in 1940, while in Arkansas and Louisiana the corresponding shifts are from 60,000 acres to 200,000 acres, and from 26,000 acres to 150,000 acres respectively.

"Down" in East

The eastern states of Delaware, Maryland, New Jersey, New York, Pennsylvania, and West Virginia are asked by the AAA to reduce their combined acreage from the 1940 total of 74,000 to 69,000 in 1942.

In the opinion of *The Soybean Digest*, the 1942 goals of the AAA, if carried out and extended into succeeding years — a reasonable probability, at least — will result in the inclusion of Mississippi, Arkansas and Louisiana as commercial soybean areas.

The contemplated increase of Michigan soybean acreage from 84,000 acres in 1940 to 100,000 in 1942, also should result in its inclusion as a commercial area in the parlance of the industry. These four states, together with the six which now are considered commercial, would bring to 10 the commercial soybean producing states.

Three Boosts

The 1942 goals are the third boost which the federal government has given to the soybean industry during the past year. The first was the reclassification of soybeans as a soil conserving, rather than a semi-soil depleting crop by the AAA. The second is the purchase of soy flour for shipment to Great Britain, which has not been less than 3,000,000 pounds a month since August, and which totaled 4,050,000 pounds for the week ending October 4.

The AAA decision to set the 1942 soybean goal at 7,000,000 acres is a recognition of the economic importance of the soybean, partly as a result of the world situation and the growing domestic demand for soybean oil and oil meal.

One immediate result will be the holding of about 1,500,000 additional bushels of the 1941 crop for seed next spring.

In summary, the AAA goals, when placed in effect, will:

(1) Bring two new states, Indiana and Iowa, into the million acre class.

(2) Increase the importance of soybean culture in the lower Mississippi valley, bringing Mississippi, Arkansas and Louisiana into commercial production.

	Acreage, Soybeans for Beans (000) Omitted				Yield per Acre			Production in Bushels (000) Omitted		
	1942 Goal	1941	1940	1930-39 Av.	1941 Estimated	1940	1930-39 Av.	1941 Estimated	1940	1930-39 Av.
Illinois	2,686	2,405	2,008	944	22.5	17.5	19.1	54,112	35,140	19,082
Indiana	1,090	908	814	304	17.0	13.5	16.6	15,436	10,989	5,317
Iowa	1,018	946	733	214	18.5	20.5	16.8	17,501	15,026	3,812
Ohio	680	640	560	137	19.0	15.0	18.0	12,160	8,400	2,694
Missouri	222	192	112	95	9.5	10.5	8.2	1,824	1,176	770
North Carolina	225	190	169	115	13.0	13.5	12.4	2,470	2,282	1,437
Six Commercial States	5,921	5,281	4,396	1,809	19.6	16.6	18.3	103,503	73,013	33,112
Other States	1,089	637	565	243	11.6	12.1	9.9	7,381	6,824	2,394
United States	7,000	5,918	4,961	2,052	18.7	16.1	16.1	110,884	79,837	35,506

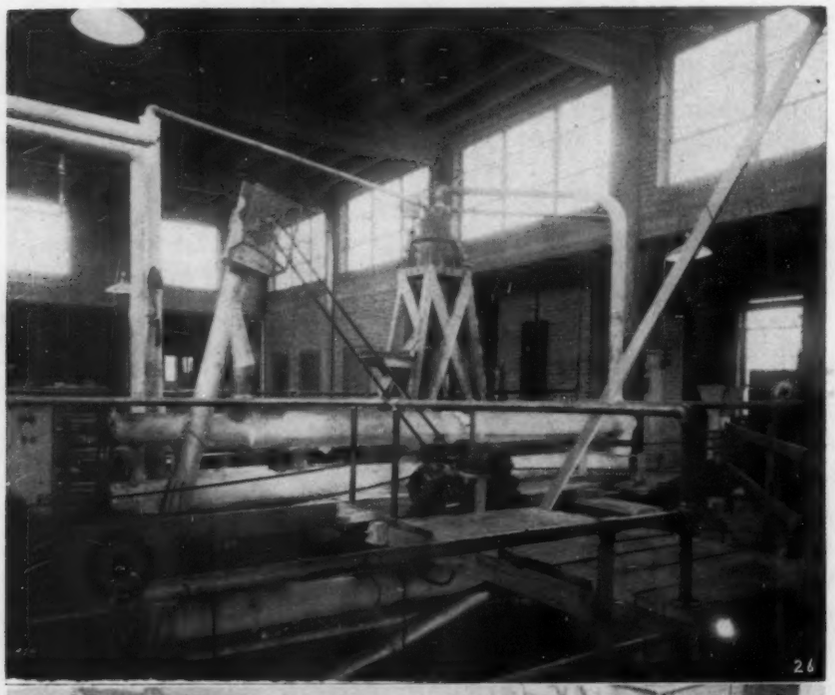
A Call For

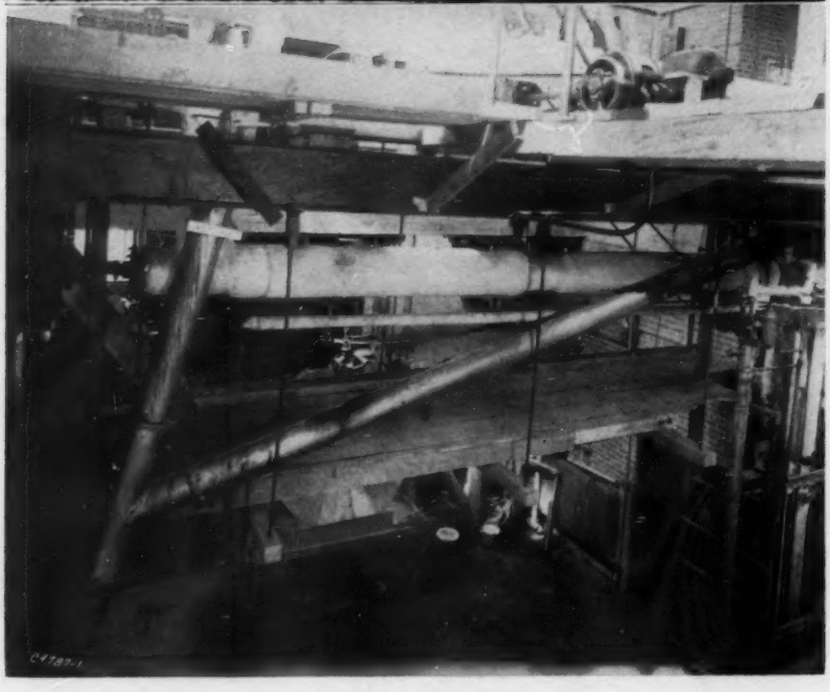
COMMUNITY PLANTS

By DR. L. K. ARNOLD, Iowa State College

HERE at Iowa State College we have been interested in the development of a small solvent extraction plant for the production of soybean oil. We are interested first of all in a small plant because we believe that small plants are most desirable not only here in Iowa but over the whole country. We believe that the concentration of industry in the form of large units in the cities is economically and socially undesirable.

With the increase in size of our cities the problems of food, housing, and transportation become increasingly acute and decidedly artificial conditions are created. With modern developments such as electric power with its usually associated city water and sewer developments, telephones, radio, moving pictures, and automobiles many of the advantages of the city without many of the disadvantages have become available in the smaller communities. This is leading definitely to a decentralization of industry — a movement away from the large industrial centers.





Top and bottom views of experimental processing plant at Iowa State College, Ames.

Close to Supply

We are well aware that large industrial units frequently possess advantages of increased efficiency in the utilization of labor and in management but would like to point out to you that the smaller soybean oil plants located close to the supply of beans and close to the buyers of the meal have savings in freight on both the raw material and finished product. Likewise while more man hours of labor per ton of beans may be required, those man hours cost less per unit in the small town than in the city.

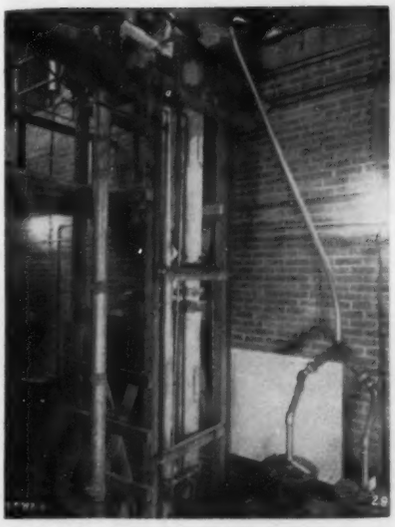
The optimum sized plant of course is dependent upon many factors, some inherent in the location, others related to the management, and others upon the characteristics of the plant itself. However, it is felt there are definite possibilities for the proper type of plant in sizes ranging from 5 to 25 tons a day, the smaller sizes to be operated in conjunction with grain elevators or feed mills.

You are familiar with the fact that there are two general methods of extracting oil from soybeans: by pressing it out or by dissolving it out. The pressure method has been developed to a high state of efficiency by use of the modern expeller. Solvent extraction units are an efficient means for oil extraction, but are available on the market only in large sizes.

Oil Amount Important

While the expeller produces a meal averaging about 5 per cent oil the extraction outfits can produce a meal containing about one-tenth of this amount. From the standpoint of profit the amount of oil produced is important since it is the higher priced product. There is good reason to believe that the solvent extraction units now operating are processing beans more cheaply than the expeller plants. However, the solvent plants have certain drawbacks. They are available only in large sizes. They use hexane, a special cut of gasoline, which is explosive. They require a considerable amount of skilled attention to operate profitably.

In setting out to design a new solvent



"And it comes out here."

extraction unit, we set up the following requirements: (1) It must be practical in small sizes; (2) it must use a non-explosive solvent; (3) it must be simple to operate; (4) moderate in first cost, and (5) economical to operate.

For this new unit we selected trichloroethylene as a solvent because: (1) it is nonexplosive and therefore safe to use; (2) it is a pure compound boiling at a low temperature (189° F.) and therefore easy to remove from the oil and meal; (3) it is a commercial American product available in quantity; and (4) it is being used satisfactorily in other industries such as metal degreasing and dry cleaning.

Counter-Current

It is well established that a solvent extraction unit to be practical must be continuous in operation and that the movement of the solvent should be counter-current to the movement of the beans. Batch extraction usually requires higher labor costs, more solvent, and greater solvent losses. In continuous counter-current operation the fresh solvent comes into contact first with the nearly extracted beans passing on to beans richer and richer in oil as the solvent itself takes up more oil. In this way it is possible to build up a relatively high solvent-oil ratio and still secure excellent oil extraction.

Commercial solvent extraction systems use several methods to secure continuous counter-current extraction. In all solvent extraction units the beans before extraction are flaked between rolls to increase the surface exposed to the solvent and thus increase the rate and completeness of the oil removal. In the Bollman system the flaked beans are carried around in a series of boxes similar to a bucket conveyor and the solvent sprayed on in such a way as to give a modified counter-current movement. In the Boehm system the solvent passes over the flakes contained in a series of extractors trickling down from one to the other through perforated bottoms. In the Hildebrand system the solvent passes down one leg of a U-shaped casing while the flaked beans are fed down the other, the solvent-oil mixture being removed just below where the flakes enter. The flakes are carried through the solvent by screw conveyors and removed just above where the solvent enters.

In the Ford system the flakes are fed in at the bottom of an inclined tube where they are carried upward counter-current through the solvent.

Screw Conveyors Simplest

The systems using the screw conveyors to move the flaked beans through the solvent are simplest of these commercial units. A little study of what happens in the U-shaped extractor indicates that since the solvent oil mixture becomes heavier as the oil content increases, probably resulting in eddy currents in one leg, counter-current extraction only occurs in one leg of the extractor. For this reason it seemed desirable to secure the desired extraction in an inclined leg using a vertical or nearly vertical leg to provide proper solvent level.

In the Ford system which uses an extractor of this general type the beans are fed into the vertical leg and the extracted meal removed from the solvent in the upper part of the inclined leg and carried on to the drier which is formed as a continuation of the extraction leg. Such a system would not operate with trichloroethylene as a solvent since a trichloroethylene-oil mixture becomes lighter as the oil content increases in contrast with a hexane-oil mixture which becomes heavier.

After preliminary study of the movement of trichloroethylene and flaked beans through tubes by means of screw conveyors, a semicommercial laboratory unit was designed, built, and put into operation. In this unit the flakes were fed into the inclined leg which consisted of a 6-inch pipe about 20 feet long and the extracted meal removed from the solvent at the upper end of the nearly vertical leg. (Fig. 1.)

This gave excellent drainage of the solvent from the meal before it was carried into the horizontal dryer located above the extractor. The solvent was fed into the vertical leg just above the solvent level and the solvent-oil mixture removed at about the same point the flakes were added. The solvent oil mixture from the extractor passed through a filter and then was pumped to the stripping still.

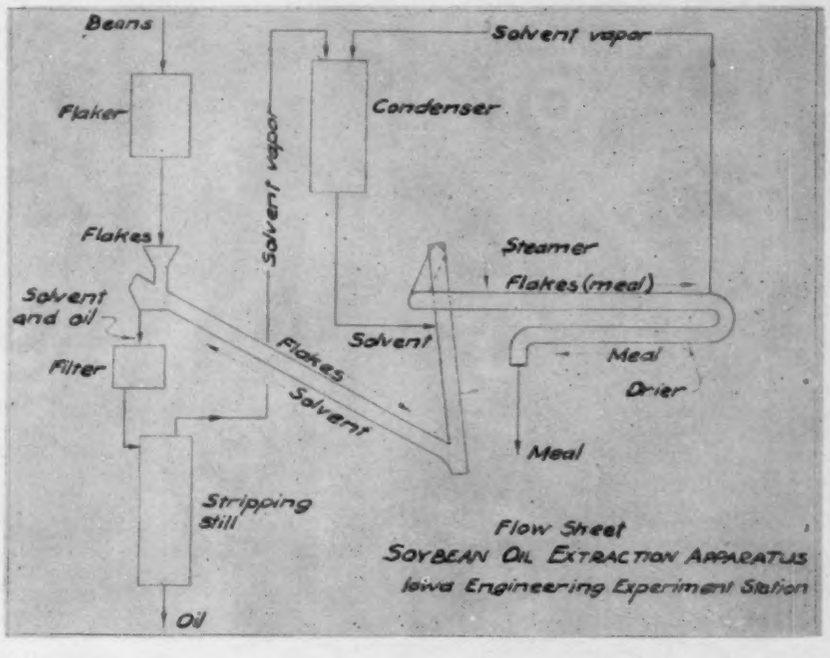
The filter used was simply a bag of canvas filter cloth enclosed in a casing made from steel pipe. The stripping still consisted of two units one above the other each containing a series of tubes such as commonly used in heat exchangers or in steam boilers. The oil ran down over the inside of the tubes which were heated by steam surrounding them. The heat vaporized the solvent which passed out through a pipe to a water cooled condenser while the oil ran out the bottom through an oil seal.

Meal Driers

The meal driers were composed of three lengths of 6 inch, steam-jacketed pipe containing screw conveyors. The meal entered the top length from the extractor and dropped from the opposite end into the length below from which it fed to the bottom dryer. Provision was made in the bottom dryer section for blowing in air or steam to sweep out the last traces of the solvent. The solvent vapors from the dryer passed to the condenser. The liquid solvent from the condenser was fed back into the extractor and reused. The meal was discharged from the dryer through a barrel valve to reduce solvent vapor loss.

The experimental outfit had a capacity of one ton per 24 hours. Various runs were made from a day or less in duration up to 10 days in length, changes being made in adjustments and details between runs. Very satisfactory extraction was secured with low solvent loss. It is be-

(*Continued on page 12*)



Flow Sheet
SOYBEAN OIL EXTRACTION APPARATUS
Iowa Engineering Experiment Station

Alabaman Declares

UNITED WE STAND

By R. J. GOODE
Former Commissioner of Agriculture, State of Alabama

NEARLY twenty years ago it was my privilege and pleasure to have visited a considerable area of the country encompassing your membership as one of a legislative committee from my state, Alabama. The purpose of this visit was to make a first hand study of your Agriculture, together with the research, educational and regulatory agencies connected with it. Since that time, I have missed no opportunity to visit with you and to be continually inspired by your people who have made the greatest success of the agricultural enterprise.

And now, if I may bring to you some small knowledge of another area of this great Nation of yours—and mine, indicating the mutuality of interest with which I have been so strongly impressed, I'm sure you too will agree, "United We Stand."

Whenever I come to the great corn and wheat belt, there are always two outstanding impressions. First, the fertility of your soils and the very abundance of your crops and livestock production are resources which challenge my comprehension. Nowhere will you find its counterpart upon the face of the earth. Second, is the realization of our already mutually advantageous relationships and the unlimited possibilities for their enhancement.

The outlets through your grain, livestock and dairy industries, not alone for our cotton fibre, but for our cottonseed by-products of oil cake and meal have been a tremendous factor in providing a market for the principal production of the Cotton South. We, in return, have purchased your butter, your cheese and other dairy products, as well as your grain, hogs, lard, beef cattle and poultry products. Your bacon and salt pork has simmered in our pots and kettles with turnip greens and black-eyed peas to provide those delectable flavours to be found nowhere but in the South—to say nothing of the market furnished for hundreds of millions of pounds of your fat-backs and sow-bellies which are a staple item of diet for a large proportion of our people but which you will not deign to eat yourselves.

Interests the Same

There is no reason, other than narrow prejudice and ruinous provincialism, which we deplore, that these mutually profitable trade relationships should not be multiplied many-fold. Naturally, there will be occasions when superficial indications point to conflict of interest, but an understanding of all the factors involved will bring the realization that our interests are fundamentally the same, and that we must hang together or we will, assuredly, be hanged separately.

Such an issue is now facing us as concerns your soybeans and our cottonseed.

The brief span of a dozen years has provided the most spectacular development known to American agriculture in

GOODE

the rise of the soybean from a negligible production of 7,000,000 bushels to over 100,000,000 bushels this year. You might expect such a development to be cause for alarm to the cotton grower, especially since the soybean and cottonseed are directly competitive in the field of both fats and feeds. Still, I can bring you the word that we have no quarrel to pick with you, but, rather, that we will stand with you in clearing the road to a free and untrammeled market for both.

Here, we are in the same boat. Though we may be travelling on different decks, our destination is the same. In 1937, we produced the greatest cotton crop on record with a correspondingly large yield of oil from the seed. At the same time importations of competing foreign oils reached a figure more than twice as large as consumption justified. In pure desperation, we were moving heaven and earth to gain some relief—through excise taxes, import duties, quotas, or anything to stop the flood of cheap foreign oils produced by coolie labor abroad. At that time other domestic producers of oils and fats did not think they had any special interest in our plight. However, when your export market for products of the Corn Belt, especially lard, was closed, it was easy to see that you did have an interest.

Cooperation Begins

This realization brought about the first real attempt at cooperation, free from sectional prejudice, of which I have known. It brought together the domestic producers of dairy products, cotton, hogs, soybeans, beef cattle and even marine oils in collaboration for the mutual interest of all. This is as it should be. It was only a little more than a year ago that our people of the South were recommending and urging assistance for lard even before asking anything for cottonseed oil. Not because we thought less of our own interests but because we realized that help for lard was also the best way to help cottonseed and soybeans. You may be assured that we stand ready to continue working with you for the same reason.

No one is more interested in the entire subject of oils and fats than the growers of soybeans and cottonseed. Any consideration of the subject immediately plunges one into the most variegated, kaleidoscopic, complicated and, withal, the most interesting and important question in our own and the economy of the world. You touch, move or misplace any one and you at once affect in some degree all the fats and oils throughout the world.

Again, as in World War No. 1, the decision will turn, not upon the lack of armaments and munitions by the Central Powers, but on the lack of essential oils and fats. Again these primary and fundamental sinews of peace and war, which spell life or death, will tip the scales in favor of those who can supply themselves with these necessities.

To the people of your section, oils and fats may mean butter, lard, tallow or soybeans, but to us it means cottonseed. To those who do not live in the South it is almost impossible to understand the importance attached to the annual cottonseed crop. Normally, the value of cottonseed represents approximately one-fourth the entire value of the cotton crop; but, to the cotton farmer, it more nearly represents 90 per cent of his interest. The explanation for this apparent inconsistency is in the fact that the cotton farmer gives a lien at the beginning of each crop year to his landlord or advancing merchant. These advances are not in the form of cash but of food, feed, fertilizer, clothing and gear for his family and his work stock.

The tenant never sees any cash money until the cotton is ginned, when he has for his very own the proceeds of his cottonseed. The lint goes to the landlord or advancing merchant and is applied to his debt, so the farmer rarely, if ever, secures any cash for the lint.

However, no matter how great the indebtedness, by immemorial custom, the seed belongs to the farmer and is the only cash he has to spend as he likes.

In addition to the importance of the seed to the individual farmer, it is the most important single factor in trade throughout the cotton states from the time the crop is gathered until the next planting time, representing practically all the money in circulation during that period. It is no wonder the cotton farmer holds so dearly this only source of cash for the necessities of life and the few small luxuries not going directly into production of the crop.

No Invasion Planned

Above all else, I wish to dispel from your minds the thought that there is any desire on the part of the South, or any immediate prospect, of invading your domain. There has been a great hue and

cry to the effect that we were threatening your livestock and dairy industry; that the diversion of a few acres of cotton to grains and feed for livestock would jeopardize your entire agricultural economy; and that restrictive legislation in the nature of the Boileau and McNary amendments were necessary to prevent this dire calamity.

Suppose we look at the facts.

For this purpose I will take some comparisons of Iowa with my own state of Alabama, which will be proportionately accurate for the two regions as a whole. Iowa and Alabama are of approximately the same area and population. Iowa has 27 million acres in crop land. Alabama 9¾ million. Iowa has 5¾ million acres of plowable pasture. Alabama 1⅓. Yields per acre and total production are still more striking. Last year Iowa averaged over 50 bushels of corn per acre for a total yield of more than 500 million bushels. Alabama averaged 11 bushels per acre for a total yield of 34 million bushels. Iowa produces around 200 million bushels of oats annually while Alabama produces from 3 to 4 million.

In 1937 the total per capita cash sales for livestock in Iowa amounted to $469.00 and for Alabama just $20.00.

Further, we buy largely from you, 35 per cent of the corn consumed in the state, 40 per cent of our meats, 65 per cent of our butter, 40 per cent of our milk, 20 per cent of eggs, 70 per cent of hay and 90 per cent of oats.

These figures point to two important and significant facts. First, that the South is not now and cannot within any reasonable period of time, by even the remotest stretch of the imagination, become a commercial competitor of your principal crops and livestock products. Second, in relation to its purchasing power, the South is by far the best customer for your principal agricultural production.

We have a one-crop cotton economy, and we now find ourselves in a serious plight due to the almost total loss of export markets, which normally took 60 per cent of our production.

Coupled with this is the fact that we have the greatest density of population on the land of any other part of the country, and our per capita income, measuring our purchasing power, is less than one-third that of the nation.

Income the Problem

The extremely low income of our people is the South's greatest handicap and to which practically all the ills of the region may be traced. Therefore, the primary consideration for its own people is to improve this income. It is almost equally important to you, so that we may have the means to purchase your goods and commodities we so sorely need.

THE

SOUTHWESTERN LABORATORIES

Established 1908

ANALYTICAL CHEMISTS

SOYBEAN — COTTONSEED

Seed Testing

WHEAT — FLOUR — FEED

Accurate Analysis

Board of Trade Bldg., Kansas City, Missouri

Official Chemists for National Soybean Processors Association

DANNEN'S Soybean Oil Meal

● **This modern mill has an annual processing capacity of 1,000,000 bushels, furnishing you a year 'round market for the soybeans you raise—furnishing also a high grade protein feed for your livestock. Use Dannen's Soybean Oil Meal made from the beans you grow.**

Dannen Grain & Milling Co.

ST. JOSEPH, MISSOURI

MARKET SUMMARY

Chicago Futures	October 15	Week Ago	Month Ago
SOYBEANS			
October (old)	$1.57	$1.67¾	$1.85
December	1.58⅝	1.69	1.85
May	1.64½	1.74	1.90
SOYBEAN OIL			
Tanks, Midwest Mills	10⅛-¼c	10¾c	10¾-11c
SOYBEAN OIL MEAL			
Memphis, Tenn., Futures			
October	$33.00 @ 35.00	$35.50 @ 36.50	$39.25 @ 40.25
December	31.50	34.35 @ 35.00	38.00 @ 38.25
May	31.25	34.65 @ 35.00	38.00 @ 38.30

"Down to earth" described the soybean market as futures receded at the end of the period under consideration, to about the level held just before the early September splurge. Futures losses ranged from 25c to 28c for all classes during the month.

Despite a slow harvest caused by wet weather, and a proposal by Senator Bankhead to place a loan on cottonseed oil at 14c, the soybean market was less than steady at the end of the period.

Depressing factors were the war news from Russia and the new trade treaty with Argentina, which will halve the duty on flax seed.

The month's losses extended to soybean oil and soybean oil meal — the former less proportionately, and the latter about the same, as the bean futures. The oil and oil meal markets were very weak at the close of the period. Cash prices followed the futures trend, closing at $1.60 on the Chicago market October 15. Prices were 20c to 30c less at outlying points.

Most soybean processing plants were shut down early in October, a fact reflected in the $2 premium on October oilmeal futures over December and May.

The record number of livestock on midwest farms, plus the shipping shortage, plus a short cotton crop indicate that soybean prices will hold up well during the next seven months. Much depends on the selling job accomplished by processors and feed dealers.

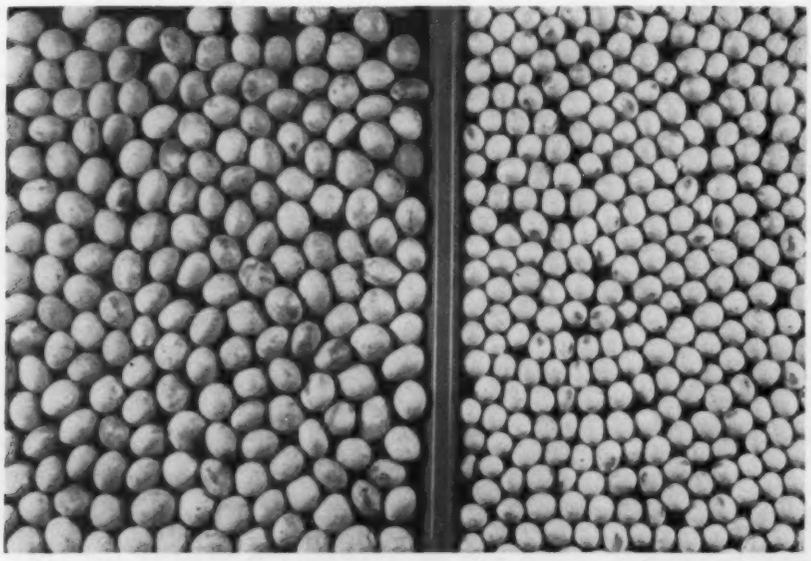
For the third time in six weeks the FSCC called for soybean bids, presumably for overseas shipment, and during the first week in October the same organization purchased 4,000,000 pounds of soy flour.

(Continued from page 1)

below other beans of comparable grade.

It is extremely regrettable that we allow a few none-too-scrupulous promotors to jeopardize the years of progress in the bean industry while they line their pockets — and all at the expense of the unsuspecting individual who does not have sufficient knowledge of beans to distinguish a promotion scheme when it confronts him. And usually the man who is fleeced is one who is just starting to grow beans. We almost shudder when we think what his conception of the bean industry may be after such an experience.

Soybeans . . . and People



Left . . Kanros, a vegetable variety. Right . . Dunfields, a field variety, showing their comparative size under similar conditions.

"VEGETABLE varieties of soybeans are superior in palatability and texture," is the verdict of the Iowa Agricultural Experiment Station after comparisons of Sac, Kanro, Jogun and other varieties of vegetable soybeans with the leading varieties of yellow field beans.

RATS . .
RATS . .
EVERYWHERE
Use . . .
RAT RUIN
Non-poisonous to humans or pets

Why allow rats to destroy poultry and foodstuffs? RAT-RUIN, a red squill product made according to U. S. Department of Agriculture formulas, will eliminate 90% of that loss.

TRIAL BOX . . . **$1.00**
Enough to Kill 200 Rats **Postpaid**

Also packed in bushel, half bushel, and one-fourth bushel baskets for quantity users. Write for prices.

Address Orders and Inquiries to

Dept. FH—The Soybean Digest—Hudson, Iowa

NO MUSS—READY TO USE

Why aren't vegetable beans grown more extensively, then? Lower yield, much greater susceptibility to shattering, and lack of development of an edible market are the chief difficulties at present.

Dr. Martin G. Weiss, young research agronomist who played a leading role at the 1941 convention of the American Soybean Association, is a firm believer in the future of the edible soybean, but one who recognizes thoroughly the difficulties involved.

Incidentally, Dr. Weiss would rather use the U. S. D. A. designation, "vegetable soybeans," rather than the University of Illinois-originated "edible soybeans."

Shattering Costly

"Vegetable soybeans," he says, "should be watched very carefully and combined immediately upon maturity. I have seen 30 or 40 per cent of the beans lost by waiting a couple of days too long in hot, dry weather."

"The right time to harvest vegetable beans is just about when you notice a little shattering and there are hardly any green pods.

"By all odds, shattering is the greatest problem in connection with the growing of vegetable soybeans. In this respect, vegetable soybeans are much worse than the field varieties. In fact, no vegetable soybean is free from shattering if they are allowed to stand for any time whatever after maturing."

Beyond the matter of speed, the Iowa station has no special recommendations to make for harvesting. As with field beans, the combine does the job.

Dryness Essential

As in the case of field beans, great care should be taken to insure dryness in storage. The beans themselves should be down to 12 per cent in moisture to prevent heating, according to the U. S. Regional Soybean Industrial Products Laboratory.

Weiss suggests two homespun remedies for insuring dryness of vegetable beans: spreading the beans 8 to 12 inches deep on the granary floor, and using a shelled corn drier, taking care that the temperature remains below 110 degrees F.

In saving beans for seed, the Iowa station recommends the setting aside of 1¾ bushels for each acre of vegetable beans which are to be planted. The reason: although approximately the same number of beans is required as for field varieties, the greater size of the vegetable beans makes a larger amount of seed necessary in terms of bushels.

After work with hundreds of varieties of vegetable soybeans, the Iowa station has decided to concentrate on three -- Sac, Kanro and Jogun.

A New Variety

The Sac bean, named by the U. S. D. A.,

will be released this winter by the Iowa Station. Its chief claim to fame is that it is an early variety, its drawback that it is slightly lower in yield than some of the others.

The Kanro variety, developed at the Iowa station, is one of the best vegetable beans from the standpoint of the palatability and yield.

The Jogun, a U. S. D. A. release, is a late bean which makes a nice sequence with the other two. If planted at the same time, the Sac, Kanro and Jogun will be ready for harvesting in that order at approximate intervals of two weeks. An alternative for a sequence is to plant one variety at different dates, but this is only partially successful as they have a tendency to come together in development as they approach maturity.

75-85% Yield

As for yield, controlled experiments at the Iowa station indicate that the yield of adapted vegetable varieties is from 75 to 85 per cent of the yield of adapted field varieties. Illini, Mukden, Manchu and Dunfield beans were used as checks. It must be borne in mind that in these experiments no shattering was allowed. Under normal conditions some further advantage may be expected in favor of the field varieties.

Peru Cottonseed Exports Curtailed

The Peruvian government issued a decree, effective August 22, 1941, prohibiting the export of cottonseed without previous authorization from the Ministry of Finance and Commerce. This measure became necessary due to a pronounced shortage in the supply of domestic cottonseed oil as a result of heavy exports of cottonseed.

In order to prevent a shortage and consequent rise in prices, a resolution of September 5, 1941, prohibits exports of all edible oils and lard without authorization from the Ministry of Finance and Commerce. Export permits for these products will be granted only after consultation with the National Bureau of Foodstuffs.

—sbd—

Seventy-Nine Enter Iowa Yield Contest

Iowa's first annual soybean yield contest has drawn 79 individual entries sponsored by 18 organizations, it is announced by Joe Robinson of Ames, secretary of the Iowa Corn and Small Grain Growers Association. Prizes totaling $150 and gold medals to local winners are being offered.

The yield for five-acre plots on each of the individual entrants' farms will be measured. Samples entered must comply with U. S. No. 2 grade.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933.

Of The Soybean Digest, published monthly at Hudson, Iowa, for October 1, 1941.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared one Geo. M. Strayer, who, having been duly sworn according to law, deposes and says that he is the editor of The Soybean Digest and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse of this form to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, the American Soybean Association, Hudson, Iowa; Editor, Geo. M. Strayer, Hudson, Iowa.

2. That the owner is: American Soybean Association, Hudson, Iowa.

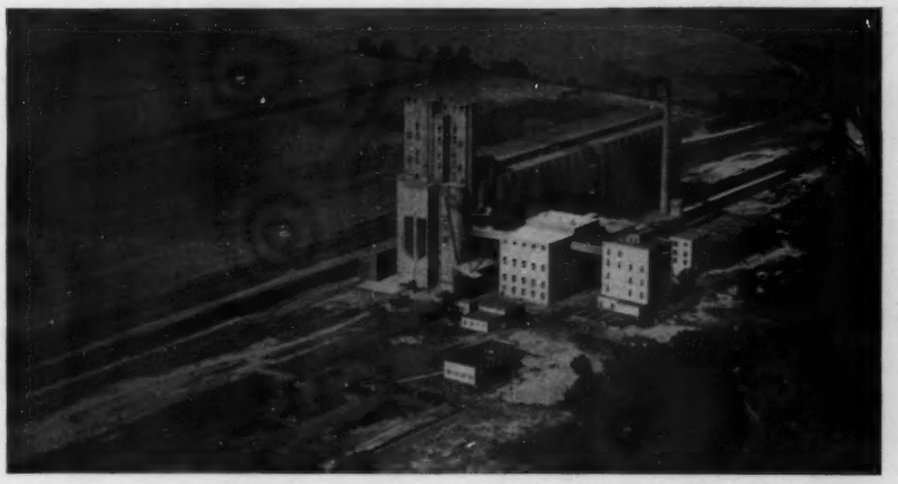
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

GEO. M. STRAYER, Editor.

Sworn to and subscribed before me this .... day of October, 1941. (Seal).

R. F. BUSCHING.

(My commission expires July 4, 1942.)



A. D. M. Soybean Processing Plant . . Located at Decatur, Illinois.

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TOLEDO
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MINNEAPOLIS
BUFFALO

WHAT IS GOOD-WILL?

Good-Will is the disposition of a satisfied customer to return to the place where he has been well treated.

The Archer and Daniels families have been engaged in the Oil Milling business for a century (1840-1940), and the good-will which has been built up during those hundred years is jealously guarded in every transaction.

ARCHER-DANIELS-MIDLAND COMPANY
MINNEAPOLIS, MINN.

The Mark of

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Quality Soybean Products

Illini Celebrate Soybean Decade

NEARLY 1,600 soybean enthusiasts—pioneer growers who nursed the new crop along, and today's more seasoned, large-scale commercial and small-scale growers — celebrated the tenth anniversary of the crop's importance September 25 at the University of Illinois College of Agriculture.

Held in the state which produces more than half the nation's soybean crop, the celebration featured a banquet honoring 52 pioneer growers who, by experimenting with the crop before 1914, helped make it the important one it is today to the nation's industry, agriculture and national defense. The pioneers were honored by Dean H. P. Rusk of the College of Agriculture, W. L. Burlison, head of the agronomy department, and more than 600 other persons.

Smith Speaks

Speakers at the pioneers banquet were Earl C. Smith, Chicago, president of the Illinois Agricultural Association, whose organization joined with the University of Illinois in sponsoring the day, and Mr. and Mrs. Leonard Elmhirst, South Devon, England. Elmhirst is president of the International Conference of Agricultural Economists.

The pioneers honored were C. Brown, Hume; William Blue, Mahomet; Arther Burwash, Champaign; Russell Davis, Clayton; C. B. Freeland, Sullivan; C. J. Elliott, Streator; Harvey Fry, Hersman; E. D. Funk, Bloomington; Dwight Hart, Sharpsburg; Perry Green, Westfield; Dan Holterman, Sadorus; Frank Hurrelbrink, Taylorville; Harold Joy, Chapin; C. H. Keltner, Rockford; J. P. Kratz, Monticello; Henry Means, Hersman; John Meatheringham, Camp Point; W. D. Mobley, Mt. Sterling; Roy Morton, Cambridge; C. H. Oathout, Tolono; W. E. Riegel, Tolono; J. Fred Romine, Tuscola; Edward Scott, Franklin; John T. Smith, Tolono; E. E. Stevenson, Streator; William Tabaka, Champaign; C. W. Thorp, Clinton; J. C. Utter, Mt. Carmel; Frank Van Doren, Tuscola; Leo Vollar, Ridge Farm; Carle Walker, Clinton; Loren Wilderman, Freeburg; L. W. Wise, Wateska; M. E. Wise, Cerro Gordo.

"Soybean Dinner-Bell"

Following talks during the morning by agronomists, engineers, farm and home economists and research specialists on the growing, cultivating, harvesting and consumption of soybeans, the group witnessed a "soybean dinner-bell broadcast" on the auditorium stage, presented by WLS, Chicago. Some of the early growers were interviewed on the broadcast and a large dinner bell, christened the "Soybean Bell," was rung during the broadcast to celebrate the occasion.

On the eve of their bumper 1941 soybean harvest, visiting growers heard G. L. Jordan, agricultural economist, predict that average October to May prices of soybeans will be about $1.75 at Chicago.

Delegates visited experiments of the College of Agriculture on varieties, cultural methods, storage, paint panels and machinery for production and harvesting of soybeans.

"New soybean varieties by hybridization — this is the method of the present and of the future," explained C. M. Woodworth, professor of plant genetics.

Soy Costs Down

R. C. Ross, professor of farm management, said that the most drastic reduction in soybean production costs took place in 1931, total costs being less than $1 a bushel for the first time that year. Since that time costs have not exceeded 80 cents a bushel.

On the basis of complete costs and the income based on prices at harvest time, the crop broke even or showed a profit in three of the 12 years, 1922-33. Beginning with 1934, soybeans showed a profit each year except 1940, when the 21.5-bushel crop at 70 cents a bushel lacked 78 cents an acre of breaking even, Ross said.

If the new varieties produced by the plant breeders do not find their way to the farms to raise the average yield there and in turn the average yield of soybeans in the state, the full value of the work has not been realized, said J. C. Hackleman, crops extension specialist.

Experiment station publications, news releases by the University of Illinois College of Agriculture, and demonstration plots conducted by local farm advisers have all been of great help to Illinois farmers in keeping them informed as to the most recent varietal releases, Hackleman said.

Solid Yields Low

Average yields from plots of Illini soybeans drilled solid at the various rates of seeding were all below the average yields from plots drilled in 24-inch rows at the same rates, W. L. Burlison, head of the agronomy department, reported.

In general, early seedings of soybeans yielded more grain than the later seedings, the yield of each of the May seedings averaging higher during six-year tests than those of either the June 1 or June 10 seedings by about 2 bushels an acre, and higher than those of the June 20 seedings by about 6 bushels an acre.

Four-year tests show that paints made with 100 per cent soybean oil or with blended soybean-perilla oil, when properly formulated, are equal in durability to similarly-formulated linseed oil paints, said T. H. Hopper, acting director, U. S. Regional Soybean Industrial Products Laboratory.

Dr. W. L. Burlison, head of the University of Illinois College of Agriculture Agronomy Department, rings the "Soybean Bell" at Soybean festival in Urbana, September 25.

HARVEST HINTS

THE major portion of the soybeans harvested for grain are now cut with a combine. It is the unusual field that is today cut with a binder, shocked and threshed with the stationary thresher, although that method is almost as satisfactory as combining. The costs are higher, and the field loss greater, but where combines are not available the ordinary thresher is entirely satisfactory.

The thresher cylinder should be run at about half normal speed, with the remainder of the machine geared or belted to run normally. Concaves should be used sparingly — just enough teeth to knock the beans out of the pods. If the beans are dry the blank concaves may be used or boards inserted in the concave bed to replace the concaves. Use just enough concave teeth to do the job — too many will split and damage the beans. A few teeth run well up will usually be better than many teeth run farther away from the cylinder.

Same for Combine

The same suggestions will apply to the operation of the combine. Normally more teeth will be required than in the stationary thresher, as the beans will usually be tougher than when threshed. If the combine has corrugated threshing bars or rubber faced concave bars the same principles will apply to adjustments. Run the cylinder at half the speed at which operated for grain, and speed up the rest of the machine to operate normally.

Adjustable sieves will usually provide satisfactory cleaning if one is used as chaffer, and a second used for cleaning. If not, try a round-hole sieve underneath, sloping it so that pods and stems will run over it and return to the cylinder. Use a weed screen which is large enough to take out most of the split beans — then it will be large enough to remove the weed seeds. That is especially important this year as dockage becomes a factor in soybean marketing. It is especially important that the weed screen be kept clean, for when filled up with seeds and straw it is worse than no screen.

Modern combines make it possible to cut extremely close to the ground. Extreme ridging, gullying, washing, or stones and rocks are all harvesting hazards. Weeds, especially the large bushy ones, will make it difficult to work the beans back into the drapers. A killing frost usually helps. Rowed and cultivated beans will usually be more weed-free and easier to harvest.

Extreme care must be used in watching the moisture percentage on beans. Rains, snowstorms, or damp mucky weather may raise the moisture percentage to a point where the beans will not keep. Even if marketed immediately the grower must take a lower grade because of moisture. Beans may keep satisfactory in a bin through cold weather, and then spoil with the arrival of warm weather in the Spring. They should never be harvested with a moisture content above 15 per cent if they are to be stored, unless facilities for drying are at hand. More beans are spoiled and lost due to over-eagerness in harvesting than to delay. There is, of course, always the danger of shattering if allowed to stand too long — and the danger of coverage with snow if allowed to stand into that season of the year. Most communities now have enough combines available so that the entire bean crop can be harvested when the right time arrives.

If the combine is operated and adjusted properly, and if the beans are low enough in moisture percentage to insure safe storage, there should be very little loss. A five per cent loss should cover all beans left on the stubbles and not removed from the pods or the straw.

Too many combine operators try to cover an acreage far in excess of the capacity of their machine, and in so doing lose beans in excess of normal operating losses. In spite of competitive selling statements, no combine will take beans at five miles per hour when the stand is good or production normal. Like cornpickers, combines are built for operating speeds comparable to plow speeds, and when too much straw is forced into them by high speeds they can not do an efficient job of threshing or separating. When harvesting by the acre too many operators lose sight of that fact.

Most of our present-day soybean varieties have overcome the predominant shattering which at one time was an important factor in soybean harvest. They will retain the beans in the pods through the winter. It is better to let them stand in the field until ready, rather than to rush through the harvest and get only a part of the crop in the bin, or to get the beans into the bin and then have them spoil. And all present-day machines are equipped with sieves that will enable good and satisfactory cleaning if the operator will but use time and care in making adjustments.

Bean Meal Aids Poultry

By Dr. J. E. Hunter

THE costs of poultry feeds are low when evaluated on the basis of cost of feed necessary to produce a dozen eggs or a pound of meat.

The intelligent usage of soybean oil meal in poultry feeds has played a significant role in helping to establish feed prices at their present level, as soybean oil meal supplies excellent quality protein at a lower cost.

Norris and associates of Cornell University have reported results of studies showing the protein efficiency of soybean oil meal to be about 90 per cent that of dried milk, and considerably above that for the three meat scrap samples reported in their study.

It is a well established fact in poultry nutrition that a variety of protein carriers, both animal and vegetable, when properly blended, produce better results than when a single protein is used. Soybean oil meal is admirably adapted to such blending, because it contains a full complement of amino acids, thus helping to accomplish maximum protein efficiency.

Because of the fact that the soybean has been extravagantly praised by some

(*Continued on page 12*)

Soybean Production Increased 57.5%

with ROCK PHOSPHATE

Sam Ackerman of Tazewell Co., Illinois (shown above in the midst of his Soybean crop) made this test with 1000 pounds of Rock Phosphate per acre. After applying the phosphate to one section, the entire field was drilled to soybeans. Production on the phosphated portion of the field was 57.5% more (weight of the whole plant) than on the part not phosphated. That's not all! There were 62% more soybeans in the pods of the plants from the phosphated land! This is typical of the results obtained from applying . . .

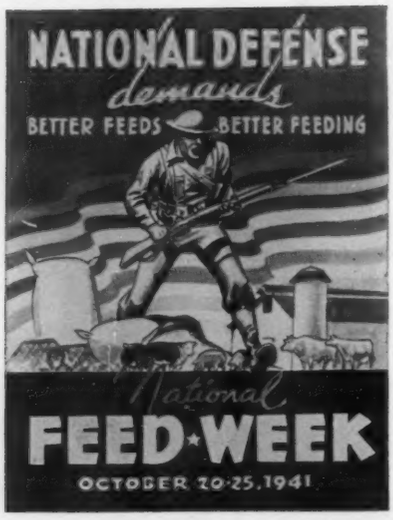
RUHM'S PHOSPHATE

This high-grade, finely ground, natural rock phosphate offers the most effective means of supplying the phosphorous which soybeans must have, to replace the great quantities of this vital element removed from the soil with each crop. It is the cheapest and the longest-lasting source of phosphorous. If you want to get bigger, better quality, earlier-maturing soybean crops write for full details and prices.

"FARMER" RUSK
Bloomington, Illinois

or

RUHM PHOSPHATE & CHEMICAL CO.
Mt. Pleasant, Tennessee



Poultry

(Continued from page 11)

writers, the poultryman sometimes entertains the idea that if soybean products are present in his rations, they are nutritionally correct. This, however, is not the case. Soybean oil meal should be regarded as an excellent protein source and not as a vitamin source, even though it is true that soybean oil meal carries an appreciable amount of several vitamins. It is not, however, a vitamin concentrate, and when used in rations to supply protein, care must be exercised to insure that vitamin carrying protein materials are not replaced to the extent that a shortage of these important food factors occur.

Since soybean oil meal properly used is an excellent ingredient in poultry feeds, some poultrymen wonder why they cannot use soybeans per se, thereby eliminating the processor. Unfortunately, this is not the case, as the beans contain more oil than poultry can use effectively, and the protein of raw beans is ineffective and must undergo critically controlled heat treatment for the development of protein efficiency.

—sbd—

Community Plants

(Continued from page 5)

lieved that a plant could be designed which would function as satisfactorily as the solvent plants in use.

However, it is believed that a more satisfactory outfit can be developed and a new one has been designed and built for experimental study. The new unit involves the use of a different type of conveyor and different solvent stripping apparatus. While a unit has not yet been developed which can be recommended for efficient small scale work it is felt that the development of such a unit is only a matter of time.

—sbd—

Increasing use of small grain combines in the corn belt has gone hand in hand with increased soybean acreage.

International Calls For Soybean Entries

Farmers who have high grade soybeans are invited to enter peck samples in the contests of the 1941 International Grain and Hay Show to be held in Chicago November 29 to December 6 in connection with the International Live Stock Exposition. Entries should be made by November 10 and the samples shipped to arrive in Chicago by November 24.

According to the management, there is no entry fee and the beans will be returned to the exhibitor after the show if requested.

Yellow or greenish yellow varieties will compete together in four classes, according to the sections of the country in which they were grown. Varieties of any other color will also compete in four similar classes. A total of 43 cash prizes totaling $110.00, each award accompanied by a ribbon, will be offered in these classes.

A champion and a reserve champion sample will be selected and the exhibitor of the former will be invited to take part in a ceremony in the arena at one of the afternoon International Horse Shows and attend a dinner to be given for the crops show champions at the Saddle and Sirloin Club on December 5. Special awards are also being offered by various states and provinces if the winning samples were produced within their boundaries.

The official placings will be made by Professor A. T. Wiancko, of Purdue; Professor J. C. Hackleman of the University of Illinois; Professor R. F. Crim of the University of Minnesota; and Henry Stevens of Scranton, Iowa. This same committee will also judge the corn classes.

Soybeans will also be featured in a number of educational exhibits at the International show this year, including one display which will tell the story of what plant breeders are doing to improve field crops.

The coming show will be the 23rd annual renewal of the International Grain and Hay Show.

ELEVATOR MEN!

The new federal standards render present soybean grading sets useless. Due to the present level of soybean prices, processors are more careful of grades than ever before. Don't get caught flat-footed! BE PREPARED with a

NEW SIEVE SET

Take Advantage of This Offer . . .

- **1 8/64" ROUND HOLE SIEVE**
- **1 10/64"x¾" SLOTTED SIEVE**
- **1 CATCH PAN**
- **1 YEAR SUBSCRIPTION TO—**

THE DIGEST

all for $5.75

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Sieves meet the new Federal grading specifications

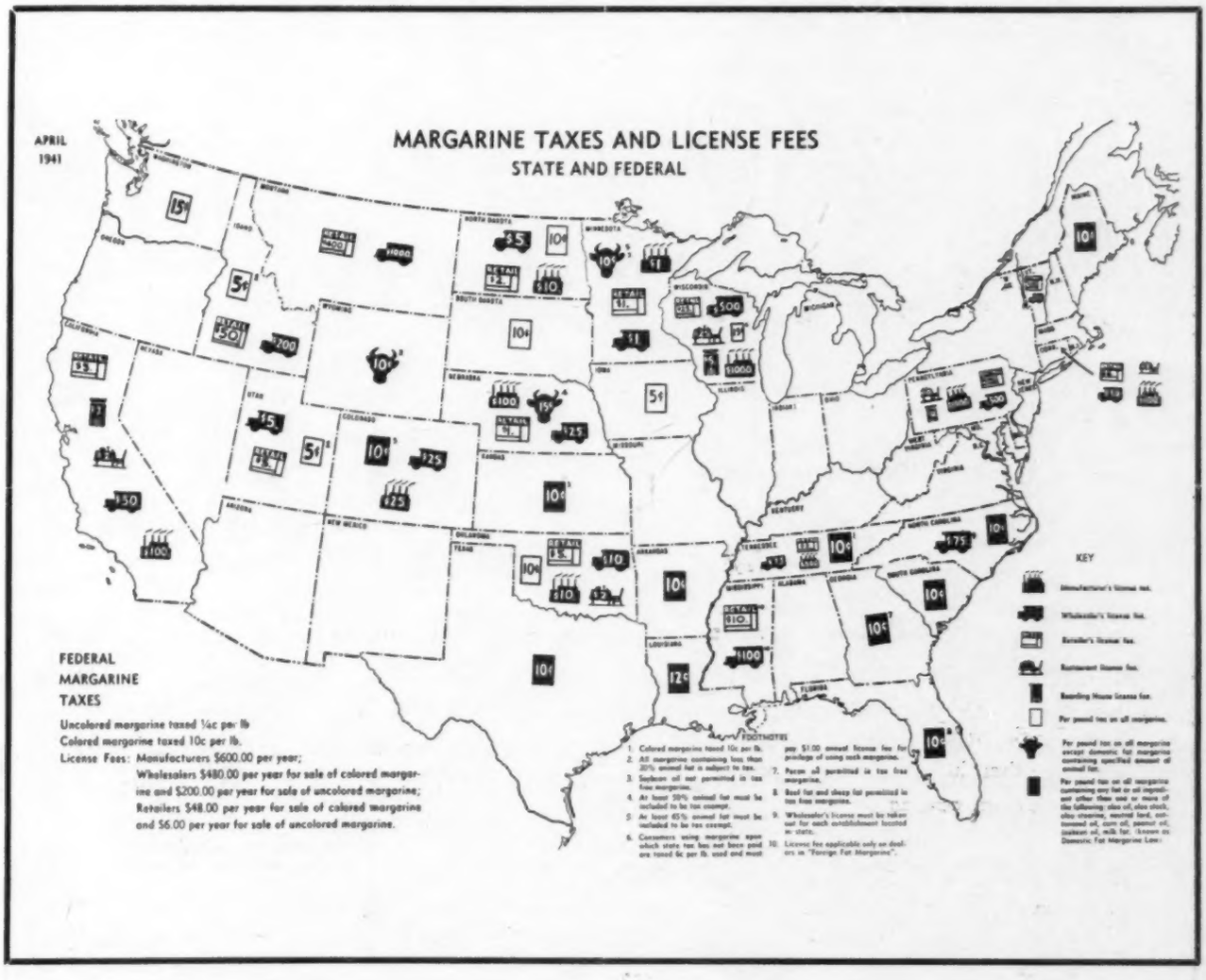
Mail your order today to THE

Soybean Digest

Hudson, Iowa

A scene at the annual Purdue University Field Day held recently. Five hundred farmers attended. More interest in soybeans than ever before is reported.

A False Note in American Harmony


APRIL 1941
MARGARINE TAXES AND LICENSE FEES
STATE AND FEDERAL
FEDERAL MARGARINE TAXES
Uncolored margarine taxed ¼c per lb
Colored margarine taxed 10c per lb.
License Fees: Manufacturers $600.00 per year;
Wholesalers $480.00 per year for sale of colored margarine and $200.00 per year for sale of uncolored margarine;
Retailers $48.00 per year for sale of colored margarine and $6.00 per year for sale of uncolored margarine.
FOOTNOTES
KEY

Soybean Oil Oleomargarine is a fine wholesome food product. This claim is supported by findings of unimpeachable authorities.

America is rich in Consumers, but only a very few of these consumers are rich, or even well-to-do. Millions of families try to make ends meet on an income of $9.00 a week. One half of all American families have an income of less than $22.00 a week. It is in this income strata of our population that Soybean Oil Oleomargarine finds its greatest market. American Agriculture and Industry must produce and make low cost wholesome food available to this large segment of our people.

It is imperatively essential to our national welfare that this market be served. Neither Agriculture nor Industry should be unnecessarily restricted in serving that market, nor should any be denied equal opportunity in rendering that essential service.

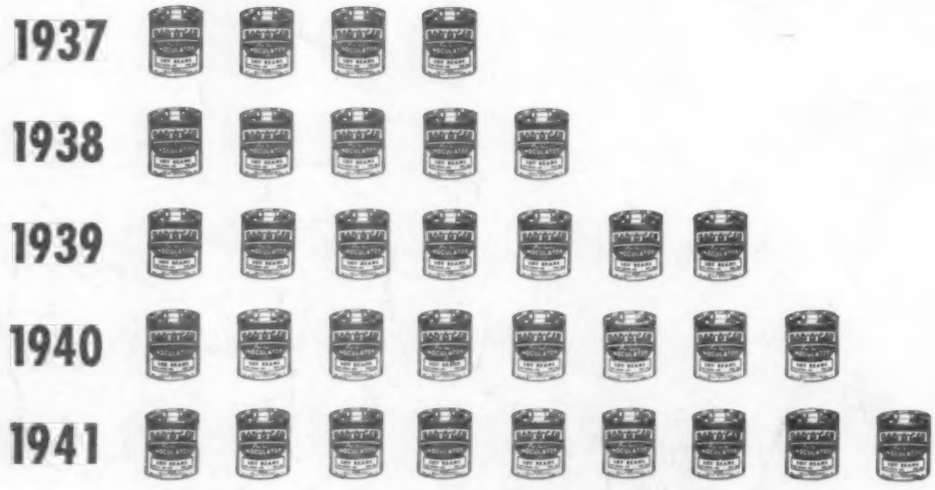
The laws above pictured, not only unfairly obstruct that service, but destroy that equality of opportunity in the market place, which is the very back bone of our National economy and the birthright of both Agriculture and Industry.

Such laws ought to be repealed.

NATIONAL MARGARINE INSTITUTE

OLD COLONY BUILDING • CHICAGO, ILLINOIS

A Huge Increase



The rapid increase in the use of NOD-O-GEN for soybeans is shown by this graph.

Yes . . . the use of NOD-O-GEN for soybeans since 1937 has increased far more rapidly than the number of acres planted to soybeans. NOD-O-GEN was a big seller in 1937, but its use since then has more than doubled. This is due to several causes.

Inoculation Pays

More and more growers have become convinced that the use of a good inoculator . . . on soybean seed just before every planting . . . pays big returns.

Nod-O-Gen's Good Record

Among growers, county agents, state colleges and the U. S. D. A., NOD-O-GEN has a good record of honest performance.

Graduate Bacteriologist

NOD-O-GEN has been produced under the supervision of a graduate bacteriologist for over 25 years, a longer continuous period than any other commercial inoculator.

Nod-O-Gen Is Pre-Tested

Before being released for use, every lot of NOD-O-GEN is pre-tested in laboratory and green house to make sure of the presence of billions of vigorous bacteria of the right kind.

Constant Research

To keep the quality of NOD-O-GEN at the highest possible peak, the NOD-O-GEN laboratories carry on a constant program of research. As soon as methods are found to make NOD-O-GEN an even better product for the grower, these methods are put to use.

Write for Booklet

Write for a 20 page booklet, "Better Crops with the Pre-Tested Inoculator," a plain language discussion of what State Experiment Stations and the United States Department of Agriculture have discovered about inoculating legumes.

Inoculator Division

THE ALBERT DICKINSON CO.

Chicago, Ill. Est. 1854

NOD-O-GEN
The Pre-tested Inoculator

America's Largest Selling Complete Inoculator Line